CLAIMS

1. Process for producing a synthetic resin molded article comprising a step of:

subjecting a synthetic resin sheet to two-step thermoforming to prepare a container and a panel like surface layer member;

wherein said synthetic resin molded article includes an outer reinforcing shell layer provided to the rear surface of said surface layer member; and

wherein said outer shell reinforcing member is obtained by subjecting to an injection molding of glass fiber reinforced ABS resin or glass fiber reinforced AS resin or non-reinforced ABS resin or non-reinforced AS resin.

2. The process of Claim 1, wherein in thermoforming the surface layer member, a step of clamping the synthetic resin sheet with a clamping unit, a step of heating and softening the synthetic resin sheet followed by moving and spreading the clamping unit in the direction in which the sheet is spread, a step of moving the spread clamping unit in the direction in which the unit is closed with lowering a plug for thermoforming partway and a step of pushing up a thermoforming mold to form the surface layer member into the shapes of a container and a panel are included, so that a surface layer member with a uniform thickness can be obtained using a thin synthetic resin sheet.

3. The process of ~~any one of Claims 1 and 2~~ Claim 1 or 2, wherein the outer reinforcing shell layer is comprised of thermoplastic resin with

sufficient strength by weighing and mixing a single or a plurality of thermoplastic resin having a resin composition and a masterbatch of long glass fiber in a predetermined proportion followed by melt kneading them in an injection molding machine, and directly injection molding the resulting mixture.

4. The process of Claim 3, wherein said resin composition is composed of AS resin, or comprised of one or two AS resin and ABS resin, said ABS resin having high concentration of rubbery polymer.

5. The process of any ~~one of Claims 3 and 4~~ Claim 3, wherein said masterbatch of long glass fiber is composed of AS resin or ABS resin which is combined with glass fiber having a length of 5 to 10 mm, and a concentration of said glass fiber is 50 to 90 % by weight.

6. The process of ~~any one of Claims 1, 2, 3, 4 and 5,~~ Claim 1 or 2 further including steps of placing said surface layer member on a injection molding mold, subsequently closing the mold with keeping a state where the mold is slightly open, injection molding a molten thermoplastic resin, and then compressing the mold until it is closed completely.

7. The process of ~~any one of Claims 1, 2, 3 and 6~~ Claim 1 or 2, wherein a male die of said injection molding mold is provided with a vacuum path, the surface layer member being placed on the male die, and the surface layer member is sufficiently engaged with the male die to evacuate the mold, and then the molten thermoplastic resin is subjected to injection molding.

8. The process of ~~any one of~~ claim 1 or 2 ~~Claims 1, 2, 3, 6 and 7~~, wherein the male die for placing the surface layer member is provided with a skidding means obtained by subjecting said surface layer member to thermoforming twice in case of subjecting to injection molding of thermoplastic resin, so that skidding effect can be obtained by sharp shape.

9. A process for producing a container and a panel of synthetic resin having a thick part such as a level adjusting leg and a reinforcing rib using the process of ~~any one of Claims 1, 2, 3, 7~~ claim 1 or 2 and 8: said process including steps of,

injecting a molten thermoplastic resin for forming the preceding outer reinforcing shell layer,

supplying an inert gas under pressure between the cavity of the injection molding mold and the thermoplastic resin from the rear side of the molded article only in the thick part such as the leg or the rib, and

pressurizing and cooling said molded article, so as to be formed integrally without forming a sink mark in the surface of the thick part such as the leg receiving part and the rib which are thin.

10. The process of Claim 9, wherein said thermoplastic resin of the outer reinforcing layer is foamed synthetic resin obtained by injecting the molten thermoplastic resin of the outer reinforcing layer, and expanding the thermoplastic resin in such a manner that an expansion ratio is less than 1.1, so that integrally forming can be attained without generating any sink mark in the surface of the thick

parts.

11. A molded article produced by the process of ~~any one of~~ ~~Claims 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10~~, wherein said molded article is a container or a panel, the synthetic resin sheet is acrylic resin sheet colored in such a manner that transparency or translucency can be attained, and wherein thermoplastic resin of the outer reinforcing layer is mixed with coloring agent and a filler in such a manner that said thermoplastic resin of the outer reinforcing layer can be colored or patterned like a marbling.

12. A molded article produced by the process of ~~any one of~~ ~~Claims 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10~~, wherein said molded article is a container or a panel, and wherein the synthetic resin sheet is colored acrylic resin sheet.

13. A molded article produced by the process of ~~any one of~~ ~~Claims 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10~~, wherein said molded article is a container or a panel, and wherein thermoplastic resin of the outer layer is glass fiber reinforced ABS resin or glass fiber reinforced AS resin or non-reinforced ABS resin or non-reinforced AS resin.

14. A molded article produced by the process of ~~any one of~~ ~~Claims 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10~~, wherein said molded article is a container or a panel, wherein the surface layer member is made of translucently colored ABS resin or AS resin or transparently colored ABS resin or AS resin; wherein at least the first layer of the surface layer

member is made of translucently colored ABS resin or AS resin; and wherein said molded article is patterned like a marble having light depth.

15. A molded article produced by the process of ~~any one of Claims 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10~~, wherein said molded article is a container or a panel, wherein the surface layer member is provided with a skidding means to have a sharp shape and an improved skidding effect obtained by subjecting said surface layer member to thermoforming twice when said outer reinforcing member is subjected to an injection molding.

16. A molded article produced by the process of ~~any one of Claims 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10;~~ wherein said molded article is a container or a panel, wherein the molded article is composed an outer reinforcing layer member, in which mean length of the glass fiber is 400 to 1000 μm.

17. A molded article produced by the process of ~~any one of Claims 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10~~, wherein a thickness of said outer reinforcing layer is reduced, in such a manner that said reinforcing layer is formed integrally with a reinforcing rib to retain a strenth.

18. A process forfor reproducing a bathtub which is the fifth embodiment of the process for producing a synthetic resin molded article comprising steps of:

(a) removing metal fittings from an acrylic bathtub to be

scrapped and cutting the bathtub into pieces of a predetermined size;

(b) feeding the pieces to a crusher to grain both the acrylic resin layer and the thermoplastic resin layer containing reinforcing glass fibers which constitute the acrylic bathtub;

(c) thermoforming an acrylic resin sheet first into a bathtub-shaped inner surface layer member;

(d) opening an injection molding mold, inserting the inner surface layer member and closing the mold;

(e) injecting a molten thermoplastic resin which is or is not reinforced with glass fibers from the second nozzle into a cavity lying between the inner surface layer member inserted to the injection molding mold and the female die;

(f) heating and melting the mixture obtained in the preceding step (b) containing the grained acrylic resin and reinforcing glass fibers and injecting the mixture into the cavity through the first nozzle;

(g) pressing the inner surface layer member firmly against the male die of the injection molding mold and remolding the inner surface layer member along the male die by softening the inner surface layer member by the injection temperature and injection secondary pressure of the thermoplastic resin and fully keeping the injection secondary pressure; and

(h) fusing the inner surface layer member obtained in the step (c) and the outer reinforcing shell layer obtained in the steps (e) and (f).

19. The process of Claim 18, wherein the acrylic resin sheet

used in the step (c) is formed of poly(methyl methacrylate) and the thermoplastic resin to be used in the steps (e) and (f) is composed of ABS resin or AS resin which is or is not reinforced with glass fibers is preferred.

20. A process for recycling the synthetic resin molded article using the process of Claim 18, wherein the acrylic resin sheet used in the step (c) is formed of poly(methyl methacrylate) and the thermoplastic resin to be used in the steps (e) and (f) is composed of ABS resin or AS resin which is or is not reinforced with glass fibers is preferred.

21. The process of any one of Claims 19 or 20, wherein as the mixture of acrylic resin and thermoplastic resin including reinforced glass fiber, recycled material obtained from acrylic bathtub which is reinforced by thermosetting resin reinforced by glass fiber is used.

22. A synthetic resin molded article comprising:

an inner surface layer;

an outer reinforcing shell layer provided outside the inner surface layer, said outer reinforcing shell layer having a sandwich structure including skin layers and an intermediate layer;

wherein said inner surface layer is made of acrylic resin;

wherein said skin layers are made of glass fiber reinforced thermoplastic resin or non-reinforced thermoplastic resin;

wherein said intermediate layer is composed of acrylic resin obtained by graining an acrylic bathtub from which metal fittings have

been removed and which is to be scrapped, and a thermoplastic resin containing glass fibers; and

wherein said synthetic resin molded article is bathtub.

23. A synthetic resin molded article comprising:

an inner surface layer;

an outer reinforcing shell layer provided outside the inner surface layer;

wherein said outer reinforcing shell layer having a two-layered structure comprising a first layer contacted with said inner surface layer made of acrylic resin, and an outermost second layer;

wherein said first layer is made of glass fiber reinforced thermoplastic resin or non-reinforced thermoplastic resin;

wherein said second layer

is composed of acrylic resin obtained by graining an acrylic bathtub from which metal fittings have been removed and which is to be scrapped, and a thermoplastic resin containing glass fibers; and

wherein said synthetic resin molded article is a bathtub.

24. The synthetic resin molded article of Claim 22 or 23 ~~any one of Claims 22 and 23~~, wherein said intermediate layer of the outer reinforcing shell layer is composed of the recycled material obtained from acrylic bathtub which is reinforced by thermosetting resin reinforced by glass fiber, and ABS resin or AS resin.

ADD B37